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# Autonomous Aerial Sensors for Wind Power Meteorology

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Risø DTU
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## Project to investigate the applicability of Autonomous Aerial Vehicles with wind sensors for wind power meteorology

This poster describes a new approach for measurements in wind power meteorology using small unmanned flying platforms. During a week of flying a lighter-than-air vehicle, two small electrically powered aeroplanes and a larger helicopter at the Risø test station at Høvsøre, we will compare wind speed measurements with fixed mast and LIDAR measurements, investigate optimal flight patterns for each measurement task, and measure other interesting meteorological features like the air-sea boundary in the vicinity of the wind farm. In order to prepare the measurement campaign, a workshop was held on 12 July 2010 at Risø, soliciting input from various communities.

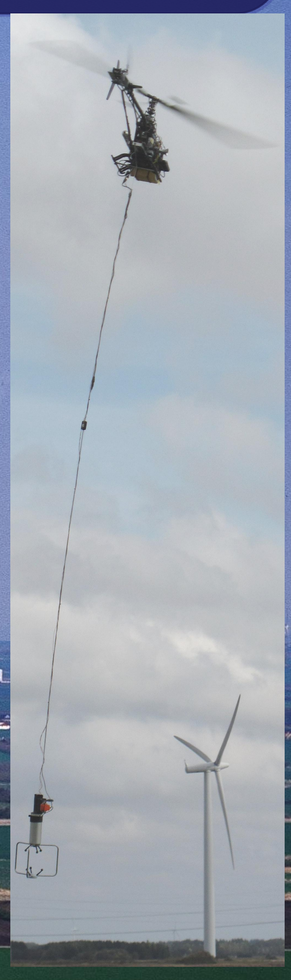
## Flight Week at Danish National Test Station for Large Wind Turbines, Høvsøre, DK

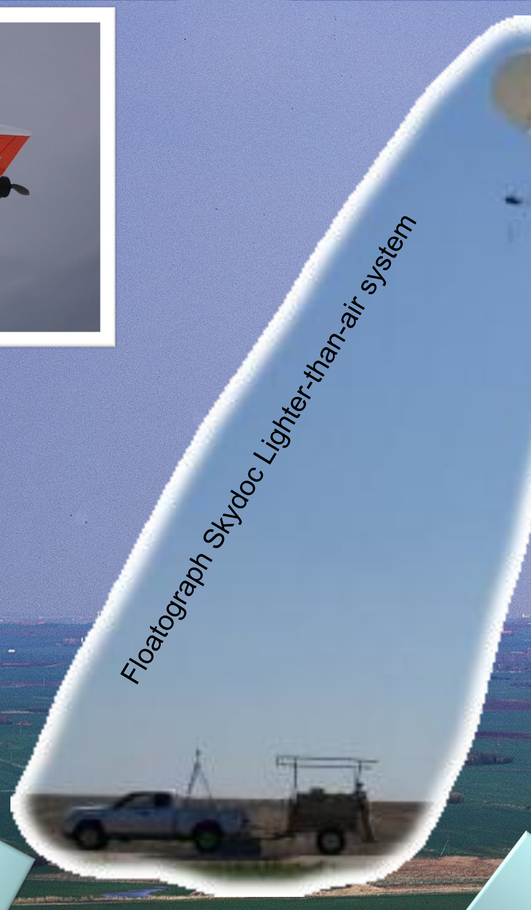
**Uni Bergen:**
### SUMO
Small Unmanned Meteorological Observer
Up to 5 planes, 580g each, equipped with GPS, temperature, pressure and humidity sensors. Potential for very small Pitot tube.

**Risø DTU:**
### Skydoc
Lighter-than-air platform
Equipped with GPS, sonic anemometer, and other met sensors. Data acquisition synchronised to 200 ns from GPS signal.

**Uni Tübingen / TU Braunschweig:**
### M²AV
2-m plane with high-resolution pitot tubes and other met sensors. Electrically flying, flight system developed by Mavionics.

**Aalborg University:**
### Helicopter
Equipped with laptop, GPS, sonic anemometer as slung load, and other met sensors. Total weight <25 kg.






5 met masts

5 large wind turbines

2 light masts, 167m

Lidars

Wakes

Flight patterns

Air-sea boundary

Profiles

Accuracy?

Loads

Taylor’s hypothesis

Distance to turbines?

Flight envelope

**Questions to answer from the project**

**Website: www.aerialwindsensors.risoe.dk**